

Subject: Risk Assessment Evaluation of Breast Feeding Pathway

Brief Summary of Major Issues:

(1) Portland Harbor Superfund Site-

- Should infant exposure from breastfeeding be included in the Portland Harbor Human Health Risk Assessment (HHRA)?
- If it is included, should this pathway be used to develop PRGs/RGs?
- If it is included, what is the best forum for communicating the benefits of breastfeeding?

(2) Methodology to Be Used to Characterize Risks for Children Consuming Breastmilk

(2) Sites Other Than Portland Harbor

- Should Region 10 EPA include this pathway of exposure in HHRAs for other sites where mother's exposure to bioaccumulatives in sediment, soil, and other media could present a risk to breastfeeding infants?

(1) Pros and Cons for Inclusion of Breastfeeding in the Portland Harbor Human Health Risk Assessment (HHRA):

Pros:

- Breast feeding is a relevant exposure pathway at the Portland Harbor site, and at many other sites with bioaccumulating chemicals.
- There are reasonable risk assessment analytical tools to evaluate risks from breast feeding. EPA has guidance for evaluating this pathway in *Human Health Risk Assessment Protocol for Hazard Waste Combustion Facilities* and it is included in EPA's 1997 *Exposure Factors Handbook* and the EPA's 2002 *Child-Specific Exposure Factors Handbook*.
- This pathway has been included in the risk assessments for the GE/Housatonic River site, numerous evaluations of hazardous waste combustion facilities, including those in Region 10, and in EPA's draft dioxin reassessment document.
- For the Portland Harbor site, we will calculate high risks to breast-feeding infants. For PCBs, the highest calculated risks are from breast-feeding, so this pathway could become the risk driver for establishing cleanup levels.
- The importance of contaminants in breast milk has been recognized by public health professionals for years. The DHS fish advisory for the lower Willamette River already states that:

Women of childbearing age, particularly pregnant or breastfeeding women, should avoid eating resident fish from Portland Harbor, especially carp, bass and catfish.

Adding the breastfeeding scenario to the PH HHRA would provide quantitative support for this public health advisory.

- It is quite likely that ODEQ will be adding this scenario to their risk assessment guidance for multiple media under the state's Superfund law and to the ODEQ's *Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment* (April 2007).
- As a part of its PH Health Consultation, DHS would like to include a request asking the LWG to fund them to conduct a sustained community outreach campaign directed towards women of child-bearing age who are suspected high fish consumers in PH. Inclusion of this pathway in the PH RI would support the need for such as request.

Cons:

- The breast milk consumption exposure scenario is unlikely to drive cleanup levels. The cleanup levels for chemicals such as PCBs, dioxins and DDT will likely be determined based on background levels not risk-based levels. Driving the risk-based values lower will not advance our cleanup.
- Given the estimated risks from breastfeeding as well as the numerous benefits to both the child and mother, EPA would require the LWG to include in the HHRA language on the benefits associated with breast feeding and the need to follow the DHS fish advisory. We do not normally include benefit language in our HHRAs and have not done so for fish consumption.
- The current fish advisory already highlights pregnant and nursing mothers and we will need to rely on fish advisories as a component of our remedy. It may be more appropriate to handle this pathway through Oregon's Department of Human Services which is in a far better position than Superfund to present information about the risks and benefits associated with breast feeding broadly and working to educate the public about the risks and benefits associated consuming fish collected from Portland Harbor.
- We are in the final stages of negotiating the methodologies and assumptions for the PH HHRA. Although the breastfeeding scenario is included in the PH RI/FS Workplan, EPA has not provided the methodologies to the LWG. This could be a very contentious issue as could the development of PRGs/RGs and the request from DHS for outreach resources.

(2) Risk Assessment Methodology and Characterization of Risk:

- Methodology for Estimating a Breastfeeding Child's Exposure: calculate PCB intake for the mother from eating fish; calculate the concentration of contaminant (e.g., PCBs) in breast-milk; calculate infant exposure assuming consumption of breast-milk.
- Risk Characterization-

Method 1 –

Generic Result at 1 ppm PCBs in fish:

Using EPA Superfund Methodology and assumption of consumption of fish with **1 ppm** of PCBs and an ingestion rate of 142 g/day results in:

- Lifetime Cancer Risk of 2×10^{-5}
- Hazard Quotients (HQ) of 600, 2,100 or 3,200 depending on exposure/toxicity assumptions (Region 10 EPA recommendation to LWG using ATSDR MRL would result in use of 2,100).

For Portland Harbor, the results are:

Breast-feeding Child

Whole body bass by river mile – 0.25 to 4.5 ppm

Lifetime Cancer Risk – 5×10^{-4} to 9×10^{-3}

HQ = 525 to 9,450 using ATSDR MRL

Whole body carp (site-wide) – 5.9 ppm

Lifetime Cancer Risk – 1×10^{-2}

HQ = 12,000 using ATSDR MRL)

Adult

Whole body bass by river mile- 0.25 to 4.5 ppm

Lifetime Cancer Risk - 4×10^{-4} to 8×10^{-3}

HQ = 30 to 500

Whole body carp (site-wide)- 5.9 ppm

Method 2 - Comparison of infant's exposure to exposure from breastmilk at background concentrations: 75 times higher for example of 1 PPM in fish tissue